

REMARKS/ARGUMENTS

Claims 1-16, 19-48 and 50-65 were pending in the present application before this amendment as set forth above. By this amendment, claims 1, 33 and 60 are amended. The amendment was not presented previously because Applicant genuinely believed that claims presented previously were in condition for allowance and accordingly, the amendment should be entered and examined.

In the October 27, 2009 Final Office Action (hereinafter "Office Action"), the Examiner rejected claims 1, 33 and 60 under 35 U.S.C. § 112, second paragraph as being indefinite. In addition, claims 1-5, 8-26, 19-22, 33-38, 1-48 and 50-65 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Pub. 2003/0003571 to Kanegasaki et al. (hereinafter "Kanegasaki"), in view of U.S. Patent Pub. 2002/0086280 to Lynes et al. (hereinafter "Lynes"). Further, claims 25-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Lynes, and further in view of U.S. Patent Pub. 2004/0142409 to Allen et al. (hereinafter "Allen"). Also, claims 6, 7, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Lynes, and further in view of U.S. Patent Pub. 2006/0194273 to Thomas (hereinafter "Thomas"). Still further, the Examiner asserted that the disclosure of the prior-filed application, Application No. 60/406,278 fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. § 112 for one or more claims in the application.

Applicant very much appreciates the Examiner's careful review of the instant application. Applicant particularly thanks the Examiner for granting and conducting a telephone interview held December 16, 2009 with Mr. Christopher Glass, a Patent Attorney for Applicant on the record. Applicant also appreciates very much the professionalism shown by the Examiner during the telephone interview. During the telephone interview, the Office Action was discussed, and particularly independent claims 1, 33 and 60 of the present invention and the cited references to Kanegasaki and Lynes. In addition, the Examiner suggested amended language for claims 1, 33 and 60 to overcome the outstanding rejection under 35 U.S.C. § 112, second paragraph. Also, it was agreed upon that the disclosure of the prior-filed Application No. 60/406278 does provide adequate support and/or enablement as provided by the first paragraph of 35 U.S.C. § 112 for a means positioned on a third substrate and adapted for electrochemical measurements of cells

responsive to a liquid medium, and that accordingly, the claims should be awarded the priority date established by the prior-filed Application.

In response, as set forth above, claims 1, 33 and 60 have been amended for better form according to the suggestions of the Examiner. Support for the amendments can be found in the disclosure as originally filed, for example in the claims as originally filed, in paragraphs from page 20, lines 25-38 through page 28, lines 1-6 of the specification and Figs. 1A, 1B, and 2 of the drawings. Applicant submits that no new matter has been added.

Any amendments to the claims not specifically referred to herein as being included for the purpose of distinguishing the claims from cited references are included for the purpose of clarification, consistence and/or grammatical correction only.

It is now believed that the application is in condition for allowance at least for the reasons set forth below and such allowance is respectfully requested.

The following remarks herein are considered to be responsive thereto.

Claim Rejections under 35 U.S.C. § 112

In the Office Action, claims 1, 33, and 60 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner asserted that “it is unclear whether Applicant intends for the claim limitations ‘means positioned in the third substrate and adapted for electrochemical measurements’ [(claim 1)] and ‘means adapted for electrochemical measurements’ [(claims 33 and 60)] to invoke 35 U.S.C. § 112, sixth paragraph.” In response, as set forth above, claim 1 has been amended to recite, in part, “an electrochemical measuring system” and each of claims 33 and 60 have been amended to recite, in part, “means for electrochemical measurements”. It is now believed that the rejections have been overcome.

Claim Rejections under 35 U.S.C. § 103 over Kanegasaki and Lynes

In the Office Action, claims 1-5, 8-16, 19-22, 33-38, 41-48 and 50-65 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki, in view of Lynes. Applicant respectfully traverses the rejections for at least the reasons set forth below.

Claims 1-16 and 19-32:

Among other unique limitations, amended claim 1 recites, in part, “a bioreactor for cultivating living cells in a liquid medium comprising... a second substrate positioned adjacent to the first surface of the first substrate; a third substrate, wherein the third substrate is positioned adjacent to the second surface of the first substrate; *and an electrochemical measuring system positioned in the third substrate and adapted for electrochemical measurements of the cells responsive to the liquid medium in at least one of the first subchamber and the second subchamber.*” (Emphasis added.)

In contrast, as understood by Applicant, Kanegasaki discloses “a well unit to be used in an apparatus whereby movements of cells based on their own actions can be accurately and easily detected, in case of detecting the chemotaxis of cells due to a chemotactic factor or the inhibition of the chemotaxis of cells by an inhibitor.” (Kanegasaki, [0009].) In one embodiment as shown in Fig. 3, for example, a “well unit [including a substrate 7 and a substrate 8] has a channel 1 and wells 2A and 2B in which a sample such as a cell suspension or a specimen solution is contained. A sample is supplied into the well 2A or 2B through a tube 3A or 3B with the use of a micropipette, etc. After [cell] migration, cells are collected from the well 2A or 2B through the tube 3A or 3B.” (Kanegasaki, [0088].) *As conceded by the Examiner on page 5 of the Office Action, Kanegasaki does not disclose that the third substrate includes a means for electrochemical measurement.* Further, Kanegasaki discloses that “[f]or detection in integrated [well] units, *it is preferable* to employ a system wherein the channels of the units are successively scanned along with *an objective lens [(i.e. using optical detection)]*.” (Kanegasaki, [0162] - [0165].) (Emphasis added.)

Further in contrast, as understood by Applicant, Lynes appears to disclose a “system for monitoring cell movement in response to chemotactic and chemokinetic factors” that is “capable of measuring changes in impedance and other electrical parameters.” (Lynes, Abstract.) On page 6 of the Office Action, the Examiner asserts that it would have been obvious to combine the Kanegasaki and Lynes references since “automated detection using impedance measurements is often times *superior to visual [(i.e. optical)] observation, which is difficult and laborious.*” (Emphasis added.) However, in direct contrast and as set forth above, Kanegasaki instead

specifically discloses *a preference for optical detection*. Thus, for at least these reasons, Kanegasaki *teaches away* from the proposed combination with Lynes.

None of Kanegasaki, Lynes, or any of the other cited references, taken alone or in combination, disclose, teach, or suggest a bioreactor having the above-mentioned limitations and also having all of the other limitations as recited in amended claim 1. For at least these reasons, Applicant submits that independent claim 1, as amended, is patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Lynes.

Accordingly, claims 2-16 and 19-32, which depend from now allowable independent claim 1, are also patentable for at least this reason.

Claims 2-16 and 19-32 also contain additional patentable subject matter. For example, claim 22 recites, in part, a bioreactor “wherein the plurality of individually addressable working electrodes are further adapted for *measuring the metabolic variables* related to the cells”. (Emphasis added.) None of Kanegasaki, Lynes, or any of the other cited references, taken alone or in combination, disclose, teach, or suggest a bioreactor having these limitations, taken alone or in combination with the limitations recited in amended independent claim 1 and/or the intervening claims. Accordingly, individual consideration of each claim is respectfully requested.

Claims 33-48 and 50-59:

Among other patentable features, amended claim 33 recites, in part “a bioreactor for cultivating living cells in a liquid medium comprising...*means for electrochemical measurements of the cells responsive to the liquid medium in at least one of the outer chamber, the intermediate chamber and the central chamber.*” (Emphasis added.)

Incorporating the reasons set forth above why amended independent claim 1 is patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Lynes, Applicant respectfully submits that amended independent claim 33 is also patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Lynes for at least these reasons.

Accordingly, claims 34-48 and 50-59, which depend from now allowable independent claim 33, are also patentable for at least this reason.

Claims 34-48 and 50-59 also contain additional patentable subject matter. For example,

claim 52 recites, in part, a bioreactor “wherein the first group of individually addressable working electrodes are further adapted for *measuring the metabolic variables* related to the cells”. (Emphasis added.) None of Kanegasaki, Lynes, and/or any of the other cited references disclose, teach, or suggest a bioreactor having these limitations, taken alone or in combination with the limitations recited in amended independent claim 33 and/or the intervening claims. Accordingly, individual consideration of each claim is respectfully requested.

Claims 60-65:

Among other unique limitations, amended claim 60 recites “a bioreactor for cultivating living cells in a liquid medium comprising...*means for electrochemical measurements of the cells responsive to the liquid medium in at least one of the plurality of chambers*, wherein each of the plurality of subchambers is in fluid communication with at least another one of the plurality of subchambers.” (Emphasis added.)

Incorporating the reasons set forth above why previously presented independent claim 33 is patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Lynes, Applicant respectfully submits that amended independent claim 60 is also patentable under 35 U.S.C. § 103(a) over Kanegasaki and/or Lynes for at least these reasons.

Accordingly, claims 61-65, which depend from now allowable independent claim 60, are also patentable for at least this reason.

Claim Rejections under 35 U.S.C. § 103 over Kanegasaki, Lynes, and Allen

In the Office Action, claims 25-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Lynes, and further in view of Allen. However, these rejections are moot in light of amendments to now allowable independent claim 1, as set forth above.

Further, even assuming that these rejections were not rendered moot for these reasons, Applicant respectfully submits that claims 25-32 are allowable over any combination of Kanegasaki, Lynes, and/or Allen for at least the additional reason that Allen fails to cure the deficiencies of Kanegasaki and/or Lynes. As understood by Applicant, Allen appears to disclose a “[n]anomotion sensor...for the detection and characterization of specimen motions”. (Allen,

Abstract.) Allen does not disclose, teach, or suggest a bioreactor having all of the limitations recited in amended claim 1, taken alone or in combination with Kanegasaki and/or Lynes. Therefore, none of Kanegasaki, Lynes, or Allen, taken alone or in combination, disclose, teach, or suggest a bioreactor having all of the limitations recited in amended claim 1.

Claim Rejections under 35 U.S.C. § 103 over Kanegasaki, Lynes, and Thomas

In the Office Action, claims 6, 7, 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanegasaki and Lynes, and further in view of Thomas. However, these rejections are moot in light of amendments to now allowable independent claim 1 (corresponding to dependent claims 6 and 7) and amended independent claim 33 (corresponding to dependent claims 39 and 40), as set forth above.

Further, even assuming that these rejections were not rendered moot for these reasons, Applicant respectfully submits that claims 6, 7, 39 and 40 are allowable over any combination of Kanegasaki, Lynes, and/or Thomas for at least the additional reason that Thomas fails to cure the deficiencies of Kanegasaki and/or Lynes. As understood by Applicant, Thomas appears to disclose an “apparatus for performing cell growth and cell based assays and methods for performing such assays”. (Thomas, [0002].) Thomas does not disclose, teach, or suggest a bioreactor having all of the limitations recited in amended claim 1 or amended claim 33, taken alone or in combination with Kanegasaki and/or Lynes. Therefore, none of Kanegasaki, Lynes, or Thomas, taken alone or in combination, disclose, teach, or suggest a bioreactor having all of the limitations recited in either of amended claim 1 or amended claim 33.

Priority

In the Office Action, the Examiner asserted that the disclosure of the prior-filed provisional application 60/406,278 fails to provide adequate support or enablement under 35 U.S.C. § 112, first paragraph. Specifically, the Examiner asserted that “Application 60/406,278 does not describe the use of a ‘means positioned on a third substrate and adapted for electrochemical measurements of cells responsive to a liquid medium’” and that accordingly, “claims requiring this limitation are not awarded the priority date established by Application No. 60/406,278.” Applicant respectfully traverses this assertion, and submits that adequate support

can be found in the disclosure of prior-filed Application 60/406,278, as originally filed, for example, on page 13, lines 15-17, on page 15, lines 13-31, and on page 16, lines 8-23.

Adequate support is therefore provided for the claims at issue and Applicant respectfully requests that the priority date established by Application No. 60/406,278 be awarded accordingly.

CONCLUSION

Applicant respectfully submits that the foregoing Response places this application in condition for allowance. If the Examiner believes that there are any issues that can be resolved by a telephone conference, or that there are any informalities that can be corrected by an Examiner's amendment, to facilitate the prosecution, please call the undersigned at 404.495.3678. No fee is due, but the Commissioner is hereby authorized to charge any petition fee under 37 CFR 1.17(f),(g) or (h) or any deficiency of fees and credit of any overpayments to Deposit Account No. 50-3537.

Respectfully submitted,

MORRIS, MANNING & MARTIN, LLP

December 22, 2009



Tim Tingkang Xia
Attorney for Applicants on the Record
Reg. No. 45,242

MORRIS, MANNING & MARTIN, LLP
1600 Atlanta Financial Center
3343 Peachtree Road, N.E.
Atlanta, Georgia 30326-1044
Phone: 404-233-7000
Direct: 404-495-3678
Customer No. 24728